

# NOAA Oil Spill Modeling

## Response, Drills, Planning

In December of 1976, the 640-foot Liberian-flag tanker *Argo Merchant* ran aground near Nantucket Island. The Coast Guard, bombarded with competing and often conflicting predictions of the oil's direction of travel, asked NOAA's newly-formed spill response team to resolve the conflicting forecasts and provide a consistent analysis of the oil's predicted movement.

NOAA's HazMat Division continues to support the U.S. Coast Guard, responding to more than 1,600 oil and hazardous chemical spills in the U.S. and abroad since the *Argo Merchant*. We've used this experience to develop advanced spill trajectory models and build a spill trajectory forecasting team with worldwide experience.

### *Spill Forecasting...*

When a spill occurs, every aspect of the response depends on projections of where winds and currents will take the oil. Millions of dollars in response costs and potential damage claims can depend on predictions of oil movement. Oil spill forecasting requires a detailed knowledge of oil release dynamics, oceanography, meteorology, oil chemistry, and oil slick observations. This is a difficult task and not a job for amateur forecasters.

We receive about 75 requests for assistance per year, so we are likely to have already modeled spills in your

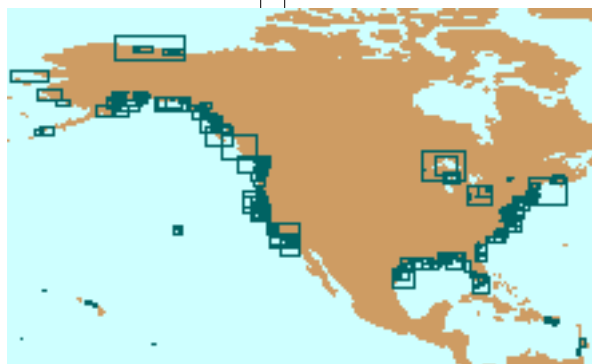
location (see map inset for locations for which we've made forecasts).

Any forecast is only as good as the information used to make it. We work with our colleagues elsewhere in NOAA and around the country to rapidly obtain the best possible real-time weather, tide, and current observations, and other oceanographic data. To prepare our forecasts, we account for local variations, such as East Coast

Gulf Stream eddies, the Mississippi River freshwater lens, Texas coastal current reversal, seasonal variation in California's Davidson Current, and convergence zones in Cook Inlet, Alaska. We use our contacts with oceanographers in every region of the country to gain more detailed knowledge of current local conditions when necessary.

### *Our Models...*

Our On-Scene Spill Model (OSSM) uses current patterns specific to the spill area (often the most critical component in accurate forecasts), prepared from actual environmental observations. OSSM also provides information on how uncertain a forecast might be, not just the "best guess" of simpler models. Knowing uncertainty is important because all forecasts are influenced by unpredictable events. For example, a forecast weather change could be



late or freshwater runoff could displace tides. Only OSSM shows a forecast's confidence limits based on uncertainty in weather predictions and other factors.

We plan to offer a desktop version of OSSM in late 1998, available free via the Internet. Users will get site specific current patterns, allowing the construction of forecasts for simple spills, area plans, and drills.

Our oil weathering model, ADIOS™, includes a database of 1,500 oils; users can also add spill-specific oil properties to the model. A new version of ADIOS, scheduled for a fall release, will aid users in identifying optimum strategies for deploying response resources such as dispersants.

#### *What We Can Do for You...*

Our spill response professionals are on call 24 hours each day, ready to help you. Our standard is to provide a first forecast within 30 minutes of a request—faster than you can reliably run a simple model. We then update our forecasts as more information becomes available. Trajectory forecasting requires more than models: it also requires understanding the response organization's needs and the limits of available information. Our team understands these needs and stands behind our forecasts. If something goes wrong, we take responsibility and fix the problem.

HazMat spill forecasts are available through any NOAA Scientific Support Coordinator, or you can call our 24-hour number: 206.526.6317. We also provide drill and area plan support. Learn more by visiting our web site: <http://response.restoration.noaa.gov>

#### *Who We Are...*

Jerry Galt

*Education:* Ph.D. University of Washington, School of Oceanography

*Spill Experience:* 23 years.

*Skills:* Remote sensing, oil observation, modeling, trajectory analysis.

Debra Payton

*Education:* M.S. University of Washington, School of Engineering

*Spill Experience:* 20 years.

*Skills:* Oil observation, modeling, trajectory analysis.

William Lehr

*Education:* Ph.D. Washington State University, Department of Physics

*Spill Experience:* 19 years.

*Skills:* Oil observation, modeling, oil weathering, trajectory analysis.

Glen Watabayashi

*Education:* M.S. University of Washington, School of Oceanography

*Spill Experience:* 20 years.

*Skills:* Modeling, trajectory analysis, drill planning, area planning.

Debra Simecek-Beatty

*Education:* M.S. University of Washington, School of Marine Affairs

*Spill Experience:* 12 years.

*Skills:* Remote sensing, oil observation, trajectory analysis.

Heather Parker

*Education:* M.S. Oceanography, Naval Postgraduate School.

*Spill Experience:* 3 years.

*Skills:* oil observation, modeling, drill and area planning.